BNFL Inc.

BNFL-5193-QAP-01, Rev. 3

TANK WASTE REMEDIATION SYSTEM PRIVATIZATION PROJECT

QUALITY ASSURANCE PROGRAM AND IMPLEMENTATION PLAN

March 27, 1998

Prepared for:

U.S. Department of Energy
Richland Operations Office
Contract DE-AC06-RL13308

Prepared by:

BNFL Inc.
1835 Terminal Drive, Suite 220
Richland, Washington 99352

BNFL Inc.

BNFL-5193-QAP-01, Rev. 3

TANK WASTE REMEDIATION SYSTEM PRIVATIZATION PROJECT

QUALITY ASSURANCE PROGRAM AND IMPLEMENTATION PLAN

March 27, 1998

Prepared for:

U.S. Department of Energy
Richland Operations Office
Contract DE-AC06-RL13308

Prepared by:

BNFL Inc.
1835 Terminal Drive, Suite 220
Richland, Washington 99352

CONTENTS

FIGURE

TABLE

APPENDIX

Note: This is a major rewrite of the Tank Waste Remediation System-Privatization Project Quality Assurance Program, therefore revision indicators are not used.

ACRONYMS

CFR	*Code of Federal Regulations*
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
HLW	high-level waste
LAW	low-activity waste
LWA	Limited Work Authorization
QA	quality assurance
QAP	Quality Assurance Program
QAS	Quality Assurance System
QL	Quality Level
RU	Regulatory Unit
SSC	structure, system, and component
TWRS-P	Tank Waste Remediation System-Privatization

INTRODUCTION

The U.S. Department of Energy, Richland Operations Office has acquired Hanford tank waste treatment services from BNFL Inc. Under the privatization concept, the waste treatment services will be provided using a contractor-owned, contractor-operated facility under a fixed-priced contract. The U.S. Department of Energy will provide the waste feedstock to be processed but will maintain ownership of the waste.

The Tank Waste Remediation System-Privatization Program work is divided into two parts identified as Part A and Part B under this contract. Part A was a 20-month period to establish the technical, operational, regulatory, and financial elements required by privatized facilities to provide waste treatment services. Part B is a 10- to 14-year period to provide waste treatment services in privatized facilities at fixed-unit prices.

The Quality Assurance Program to support Part A activities of the contract was prepared by BNFL Inc. as prime contractor, submitted to the U.S. Department of Energy, and approved at the beginning of Part A. This Quality Assurance Program has been revised to support the performance of Part B, the design stage, of the Tank Waste Remediation System-Privatization Contract.

PROJECT QUALITY POLICY

BNFL Inc. is committed to establishing and implementing a Quality Assurance Program that meets the requirements of Title 10, *Code of Federal Regulations*, Part 830.120, "Quality Assurance Requirements."

BNFL Inc. endorses the following principles stipulated by the U.S. Department of Energy in the document, *Top-Level Radiological Nuclear, and Process Safety-Standards and Principles for Tank Waste Remediation System (TWRS) Privatization Contractors*, DOE/RL-96-0006, Revision 0:

- Quality Assurance
- Safety Classification
- Safety Responsibility
- Safety/Quality Culture
- Configuration Management
- Proven Engineering Practices.

Quality assurance and quality control shall be applied throughout all phases of the project and to all activities affecting quality associated with the facility as part of a comprehensive system to ensure that all items delivered and services and tasks performed meet required standards.

The Tank Waste Remediation System-Privatization Project Quality Assurance Program is endorsed by BNFL Inc. Corporate Quality Assurance Management and approved by the Project Manager for the Tank Waste Remediation System-Privatization Project. All subcontractors that perform work as part of the integrated project team organization must comply with the requirements of this Quality Assurance Program.

BNFL Inc. TWRS-P Project Manager Approval		
Printed Name: Richard Hall	Signature:	Date:
BNFL Inc. Corporate Quality Assurance Manager Concurrence		
Printed Name: Ray Laskey	Signature:	Date:
Prepared By: BNFL Inc. TWRS-P Project Quality Assurance Manager		
Printed Name: Constantin Maciuca	Signature:	Date:

1.0 QUALITY PROGRAM

1.1 PURPOSE AND SCOPE

The purpose of the Quality Assurance Program (QAP) is to define the overall Tank Waste Remediation System-Privatization (TWRS-P) Project QAP and the organizational structure, functional responsibilities, levels of authority, and interfaces for those managing, performing, and assessing work activities governed by the QAP.

This QAP addresses performance of the design stage of Part B of the TWRS-P Contract. Part B activities include the following:

- Initial design
- Detailed design
- Procurement
- Construction
- Operation
- Deactivation.

The requirements of the QAP are applicable to activities affecting quality of the Important-to-Safety structures, systems, and components (SSC) using a graded approach. The safety classification of SSCs is based on the results of accident and hazard analyses performed during the design process.

The QAP and the Implementation Plan shall be revised before construction to address site preparation and construction activities, before start-up and operation, and before initiating deactivation.

1.2 REQUIREMENTS

The BNFL Inc. TWRS-P Project Management retains primary responsibility and accountability for the scope and implementation of the QAP. The QAP requirements are binding for all TWRS-P Project staff as well as others who may be contractually required to work in accordance with this QAP.

The Quality Management System described in this document provides topical requirements necessary to demonstrate conformance with the quality assurance (QA) elements detailed in 10 *Code of Federal Regulations* (CFR) 830.120 and other specified requirements and guidance, as follows:

- ASME NQA-1-1994 Edition, Part I, *Quality Assurance Requirements for Nuclear Facility Applications*

- QARD, DOE/RW-0333P, *Quality Assurance Requirements and Description for the Civilian Radioactive Waste Management Program*, Rev. 5, 1995

- NUREG-1293, *Quality Assurance Guidance for a Low-Level Radioactive Waste Disposal Facility*, U.S. Nuclear Regulatory Commission, Rev. 1, 1991.

Table 1-1 provides a compliance matrix detailing the consistency of the QAP with NQA-1/DOE/RW-0333P/NUREG-1293.

Additional implementing requirements and guidance for elements of the QAP that apply to Part B Important-to-Safety work will be used, as appropriate. Requirements and guidance considered for use in the context of commercial and U.S. Department of Energy (DOE) practices include:

- ISO 9001 (ANSI/ASQC-Q9001), *Quality Systems — Model for Quality Assurance in Design/Development, Production, Installation, and Servicing*, 1993

- International Atomic Energy Agency (IAEA) Safety Guide 50-C-QA, “Establishing and Implementing a Quality Assurance Programme”

- ANSI/ASQC E-4, “Quality Systems Requirements for Environmental Programs,” 1994.

1.2.1 Graded Approach

The degree of application of the QA requirements is dependent on the importance of the equipment, processes, and facilities to (1) prevent or mitigate a release of radiological and hazardous material that could exceed exposure standards, (2) prevent a nuclear criticality, or (3) ensure exposure standards for normal operation are met. This is accomplished through the appropriate level of effort (graded approach) necessary to attain and document the accomplishment of the established requirements.

The graded approach process for the TWRS-P Project QAP requirements is determined based on the following quality level (QL) designation in conformance with the Important-to-Safety concept.

- Quality Level 1 (QL-1): SSCs needed to prevent or mitigate accidents that could exceed public or worker radiological or chemical exposure standards and SSCs needed to prevent criticality. This includes both those front-line and support systems (such as power and controls) needed to meet the exposure standards. QL-1 represents a designation for a SSC that must have its development, design, procurement, construction, fabrication, installation, and/or maintenance controlled to a higher degree to ensure that the requisite level of quality is achieved. QL-1 requires application of the full

scope of the QAP to meet the consensus standards (e.g., 10 CFR 830.120, NQA-1).

Table 1-1. Compliance Table -
ASME NQA-1/DOE/RW-0333P/NUREG-1293 vs.
TWRS-P Quality Assurance Program Manual, Rev. 3.

NQA-1*/DOE/RW-0333P*/NUREG-1293*	TWRS-P QAP
1. Organization	Section 1.0, 1.2.4
2. Quality Assurance Program	Section 1.0, Section 2.0
3. Design Control	Section 6.0
4. Procurement Document Control	Section 7.0, 7.2.1
5. Instruction, Procedures, and Drawings/ Implementing Documents	Section 4.0
6. Document Control	Section 4.0, 4.2.1
7. Control of Purchase Items & Services	Section 8.0
8. Identification & Control of Items	Section 5.0, 5.2.2
9. Control of Processes/Control of Special Processes	Section 5.0, 5.2.3
10. Inspection	Section 8.0, 8.2.1
11. Test Control	Section 8.0, 8.2.2
12. Control of Measuring & Test Equipment	Section 8.0, 8.2.3
13. Handling, Storage, and Shipping	Section 5.0, 5.2.5
14. Inspection, Test, & Operating Status	Section 8.0, 8.2.4
15. Nonconforming Items	Section 3.0, 3.2.1
16. Corrective Action	Section 3.0, 3.2.2
17. QA Records	Section 4.0, 4.2.2
18. Audits	Section 10.0

* Indicates the Basic Requirements of ASME NQA-1, DOE/RW-0333P, and QA Criteria of NUREG-1293. Supplementary requirements are to be addressed as required by specific project activities.

- Quality Level 2 (QL-2): SSCs needed to achieve compliance with the radiological or chemical exposure standards for workers and the public during normal operation and SSCs that place frequent demands on, or adversely affect the performance of safety functions if they fail or malfunction. QL-2 represents a designation for a SSC that must have its development, design, procurement, construction, fabrication, installation, and/or maintenance controlled but to a lesser degree than an item designated QL-1. The number of controls employed (and possibly the degree of control application) shall be sufficient for items classified as QL-2 to reflect the lower potential consequences from the failure of the item.

- Quality Level 3 (QL-3): SSCs whose failure has no impact on Important-to-Safety functions if they fail or malfunction. The application of the QA programmatic requirements shall be determined based on the importance of the SSCs in supporting the project mission. This level of assurance requirements incorporates a lesser degree of stringency, while maintaining sound business practices and compliance with industrial codes and standards.

The graded approach process is detailed in project procedures prepared before performing Part B design activities, as indicated in the Implementation Plan (Appendix A). During the detailed design stage, a list of Important-to-Safety SSCs shall be developed. Specific QLs and associated QAP requirements shall be assigned to Important-to-Safety SSCs in accordance with project procedures.

1.2.2 Objective

The objective of the TWRS-P QAP is to establish planned and systematic actions necessary to provide confidence that all activities affecting quality on the TWRS-P Project are satisfactorily conducted to meet radiological, nuclear, and process safety requirements, and mission objectives.

The TWRS-P QAP represents the top tier document of the quality system and illustrates management's commitment to ensuring quality by applying the criteria of 10 CFR 830.120 and other QA elements to all activities affecting the quality of Important-to-Safety SSCs and project mission.

The TWRS-P QAP is supported by implementing procedures developed specifically for the project or approved for use on the project.

The approval of project implementing procedures requires verification that the procedures incorporate applicable elements of the TWRS-P QAP.

1.2.3 Quality Assurance Program

The QAP is comprised of the QA elements described in this manual and project procedures and instructions prescribing activities affecting the quality of work that implements the QAP.

The structure and format of the BNFL Inc. TWRS-P QAP are based on the 10 criteria presented in 10 CFR 830.120, "Quality Assurance Requirements." These 10 criteria constitute

the major section titles of the BNFL Inc. QAP.

This QAP shall apply to activities related to the high-level waste (HLW) and low-activity waste (LAW) from facility design through qualification, production, and acceptance of waste. Amplifications of requirements and descriptions unique to HLW and LAW shall be implemented as applicable to the TWRS-P Project.

1.2.4 Organization

The TWRS-P Project Team consists of BNFL Inc. as prime contractor to the DOE and the following principal BNFL Inc. subcontractors:

- BNF UK Group
- GTS Duratek
- Bechtel National, Inc.
- Science Applications International Corporation.

The TWRS-P Project Team, under the leadership of BNFL Inc., is an integrated organization placing the most suitable individual from each company in the project position in order to derive maximum benefit from the experience of each firm in their assigned technical, management, and QA area. The QAP is the singular top-level quality program for TWRS-P Project integrated team. Each principal subcontractor performing its own workscope is responsible for the development and implementation of a sub-tier QAP that meets applicable requirements of the BNFL Inc. QAP.

BNFL Inc., as the prime contractor, retains overall responsibility for the execution of the work under the contract and the overall implementation of the QA requirements.

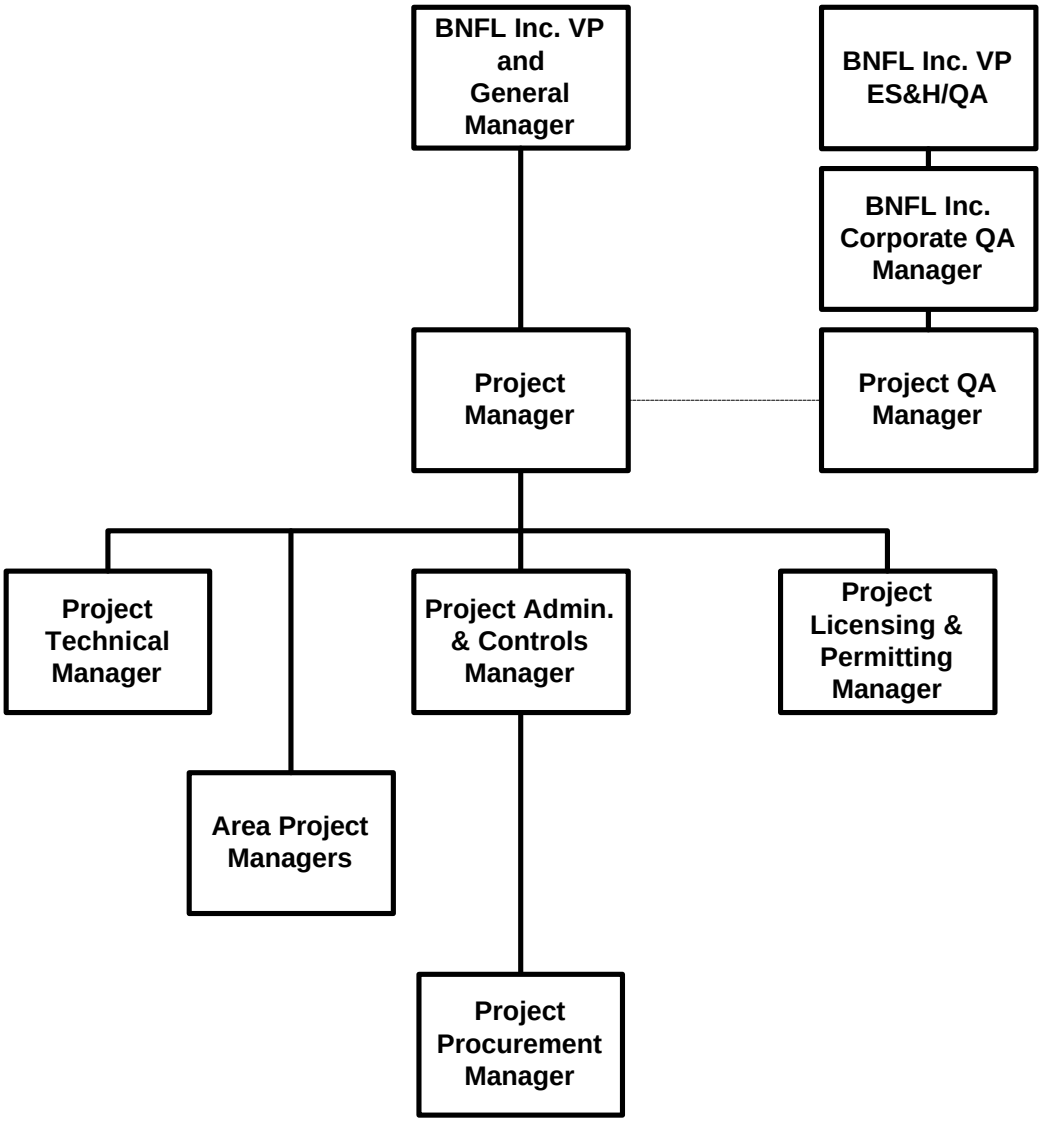
The TWRS-P Project Manager is responsible for the proper execution of the work under the contract and is directly responsible for the performance of the work undertaken by both BNFL Inc. and the principal subcontractors. The overall project management organization for the design stage of the project is shown in Figure 1-1.

The TWRS-P Project Team will provide members of the DOE, and personnel authorized by the DOE to inspect, access to workplace, records, individuals, and other items related to the implementation of the TWRS-P QAP needed for the DOE to conduct inspections to verify compliance with the QAP requirements.

1.3 RESPONSIBILITIES

The General Manager has full authority to represent and commit the TWRS-P Project Team on all matters related to the fulfillment of the contract obligations. He/she is responsible for the control and allocation of funds to achieve the project mission, including the development and implementation of the QAP.

Figure 1-1. Overall Project Management Organization (Design Stage).



The TWRS-P Project Manager is responsible for project management, integration, direction, and performance based on the scope of work, agreed-on DOE top-level standards and principles, and project policies and procedures. The Project Manager also is responsible for approval of QAP and the Implementation Plan. The Project Manager establishes and maintains internal and external interface controls for the project. The relationship between the TWRS-P Project Manager and the TWRS-P QA Project Manager is one of project coordination and QA support.

The TWRS-P Technical Manager is responsible for establishing the technical basis for the project and the technical integration of the overall flowsheet. The TWRS-P Technical Manager also is responsible for providing leadership and guidance in the technical area to ensure satisfactory process design and for the technical adequacy of the design documents.

The TWRS-P Area Project Managers are responsible for ensuring the compliance of project documents with applicable engineering codes and standards. The Area Project Managers also are responsible for providing direction to subcontractors and verifying that project deliverables satisfy the design requirements.

The TWRS-P Project QA Manager reports directly to the Corporate (BNFL Inc.) QA Manager. This is essential to independently and effectively verify program requirements and to ensure product quality. The TWRS-P Project QA Manager position has direct access to the TWRS-P Project Manager.

The TWRS-P Project QA Manager is responsible for keeping the TWRS-P QAP current and has sufficient authority and organizational freedom to verify that the TWRS-P Project activities are performed in accordance with the requirements specified in applicable codes and standards. The Project QA Manager is responsible for interfaces with DOE and project functional organizations on QA activities and for providing overview of project work activities.

The TWRS-P Project QA Manager has the authority and responsibility to stop project work when the work, if allowed to continue, would result in activities or documents being noncompliant with stated requirements to an extent where it would be impossible to correct the conditions or determine their acceptance if work was allowed to continue. The TWRS-P Project QA Manager is responsible for determining when appropriate corrective/preventative action has been taken and for lifting the Stop Work Order to allow work to proceed.

This type of “programmatic” stop work authority shall continue through all phases of the project (i.e., design, procurement, construction, operation, and deactivation). In addition, the line managers and responsible supervisors (e.g., construction crew supervisors, operation shift supervisors) have stop work responsibility and authority within their scope of supervision and at any time, if an unsafe condition is found to exist.

The TWRS-P Project Licensing and Permitting Manager is responsible for the development and implementation of the regulatory, nuclear, and process safety project documents. The Licensing and Permitting Manager also is responsible for the interfaces among the DOE Regulatory Unit (RU), State of Washington Department of Ecology, Federal Agencies, and project functional organizations for the preparation, control, and implementation of the documents required throughout the regulatory process.

The TWRS-P Project Administration and Controls Manager is responsible for establishing a cost and schedule performance monitoring system, maintaining the project summary-level performance information, and preparing the required performance report. The TWRS-P Project Administration and Controls Manager has the overall responsibility to manage all contracts for the project, provide procurement oversight, and coordinate the delivery of items to ensure that no delays occur during construction.

The TWRS-P Project Procurement Manager is responsible for ensuring that procurement documents are issued only to qualified suppliers listed on the project approved suppliers list for Important-to-Safety SSCs. The Procurement Manager also is responsible for implementing QAP requirements for long-lead procurement activities and for the final approval of procurement.

1.4 MANAGEMENT PROCESSES

The TWRS-P Project Management approach has been established to ensure project continuity and success while assigning responsibility and accountability for specific scope to each project team member. BNFL Inc., as the Prime Contractor, provides the project management oversight and integration of subcontractors performing engineering, procurement, and construction, regulatory and nuclear safety management, operation management, and interface with DOE and regulatory agencies.

The Project Baseline is an integrated Precedence Diagraming Method schedule that is resource loaded to reflect increments of the project estimate and is to be developed and maintained in conformance with the *TWRS-P Project Procedures*. These project procedures establish the standards for the TWRS-P Project to be used by the TWRS-P Project Team and its principal subcontractors to develop a cost and schedule plan, collect costs, forecast future requirements, and measure and report performance.

1.5 PROGRAM REVIEWS

The TWRS-P Project Manager and TWRS-P Project QA Manager shall review annually and revise, as appropriate, the TWRS-P Project QAP, project quality policies, and implementing project procedures.

Changes to the QAP and Implementation Plan that affect commitments specified in a previously approved QAP and Implementation Plan shall be submitted to the RU for review and approval 30 days before the implementation of subject changes. These changes submitted for approval to the DOE shall be regarded as approved 30 days after submittal, unless approved or rejected by the DOE at an earlier date.

2.0 PERSONNEL TRAINING AND QUALIFICATION

2.1 PURPOSE

The purpose of this section is to establish requirements and responsibilities to ensure personnel are qualified and appropriately trained to perform their work in a quality manner including their initial proficiency; maintenance of proficiency; and adaptation to new technologies, methods, or responsibilities.

2.2 REQUIREMENTS

A basic principle of BNFL Inc.'s corporate policy is that the company shall hire employees with the proper educational background (formal degrees, diplomas, and/or years of experience) to fit established positions. Training and qualifications shall be commensurate with the scope, complexity, and nature of the activities performed. Indoctrination and training programs shall be established and implemented, as appropriate.

Personnel receive indoctrination and training to become familiar with the procedures and systems developed to govern and support quality-related activities as well as the project's overall quality process. Training is provided, as necessary, to ensure that personnel maintain proficiency in accomplishing assigned tasks in accordance with all applicable requirements. Indoctrination and training activities shall be completed before performing the assigned work. Indoctrination and training activities shall be documented.

2.3 RESPONSIBILITIES

TWRS-P Project Managers at all levels are responsible to commit resources and provide training to project personnel performing activities that affect quality within their organizations.

The TWRS-P Project Manager is responsible for assigning qualified personnel to perform project tasks. Personnel selected to perform work shall have the experience and ability to provide the necessary quality performance. The TWRS-P Project Manager and line managers are responsible for establishing training requirements for project personnel and for instructors. The TWRS-P Project Manager and line managers shall review job responsibilities and scope-of-work assignments to ensure that the training program is maintained current with work assignments and is updated to improve overall work performance. A training and tracking matrix shall be maintained to reflect the status of the training program.

The TWRS-P Project Management shall establish periodical assessments (at least annually) of qualification and training requirements to ensure that they continue to reflect the current systems, procedures, and policies applicable to each position.

The project engineering personnel required to perform work shall have knowledge of systems engineering methods, radiological, nuclear, and process safety regulations, as well as waste treatment technology and advanced engineering techniques.

Training consists of on-the-job training, formal training sessions, reading assignments, refresher courses, technical seminars and conferences, and self-study. Formal training, when

required, is provided by qualified instructors who possess the technical and instructional skills needed to accomplish instructional assignments in an effective manner.

The TWRS-P Project QA Manager works with the Project Manager to ensure that indoctrination and training are accomplished and documented. Basic QA indoctrination includes an introduction to the TWRS-P Project QAP and related quality policies and implementing procedures. Basic QA indoctrination also stresses the necessity of personnel awareness of the program requirements.

The TWRS-P Project QA Manager shall coordinate with the project line managers the monitoring and evaluation of the status and effectiveness of the indoctrination and training programs. The results of the evaluation (e.g., audit, surveillance, assessment) shall be forwarded to appropriate levels of project management, as well as the BNFL Inc. Corporate QA Manager.

When required by applicable codes and standards, qualified personnel shall be certified to perform specified activities. Periodic training to maintain certifications is mandatory and shall be conducted and documented in accordance with approved procedures.

Activities requiring certification include the following:

- QA audits
- Audits of suppliers
- Nondestructive examination
- Construction inspections and tests
- Site activities (i.e., equipment operation, fire protection, training for hazardous waste workers)
- Engineering activities requiring professional engineer licensing in the State of Washington.

Certifications include identification of the person and specific activities, experience, prior training, capability demonstrations and test results (as required), signature of the designated person responsible for certification, certification date, and date of expiration.

When special processes are subcontracted, the appropriate requirements for the activity are included in the procurement documents in accordance with Section 7.0, “Procurement.”

Training records and qualification certifications for individuals performing QA-related activities are designated “quality records” and managed as such under the records management program.

3.0 QUALITY IMPROVEMENT

3.1 PURPOSE

The purpose of this section is to establish the TWRS-P Project policies, requirements, and responsibilities to prevent conditions adverse to quality, control nonconforming conditions, take corrective action when appropriate, and continuously improve process and product quality.

3.2 REQUIREMENTS

The improvement of quality and work processes used to achieve quality in BNFL Inc. services is embedded in BNFL Inc. Corporate policies. Continuous improvement is an integral part of TWRS-P Project Team activities. Work processes are embedded with elements to detect and prevent quality problems as part of performing the work. Continuous attention is given to the quality of work performed, procedural effectiveness, and customer satisfaction. The QAP is a management tool that provides structure to the quality process and supports achievement of the quality requirements of our customers.

The TWRS-P Project organization is committed to building a culture that makes continuous improvement a normal part of doing business for the project team. It is management's policy that the responsibility for improvement belongs to each individual and organization, including those having responsibility for planning, scheduling, and cost control. Processes are established and implemented to detect and prevent quality problems, prevent recurrence, and to provide for quality improvement. Quality improvement is achieved through implementation of the following:

- Management assessment and independent assessment
- Project reviews
- Surveillance
- Technical oversight
- Lessons learned
- Corrective Action Management
- Analysis of data for trends
- Employee recommendations
- Training to quality improvement process.

The TWRS-P Project process for quality improvement provides a mechanism for any employee to identify quality concerns. Internally identified problems, as well as deficiencies identified by the DOE organization responsible for TWRS-P, are documented, evaluated, and corrected. All project personnel have an obligation to identify nonconforming conditions or services in the areas subject to the QAP. Project personnel shall be informed of this obligation as part of their initial indoctrination and training.

No adverse actions shall be taken against an employee for identifying a condition, in areas subject to the QAP, that the employee reasonably believes is adverse to quality.

3.2.1 Control of Nonconforming Items, Services, and Processes

Nonconforming items, services, and processes shall be properly identified and controlled to prevent inadvertent use. Nonconformance documentation shall clearly identify and describe the characteristics that do not conform to specified criteria. Nonconformance documentation shall be reviewed, and recommended dispositions of nonconforming items shall be proposed. Justification for disposition shall be provided by the responsible technical organization and shall be documented fully.

Nonconforming items, services, and processes shall be identified, controlled, and dispositioned in accordance with approved procedures.

The methods for controlling items, services, and processes that do not meet requirements or specifications include the following dispositions: reject, repair, re-work, or use-as-is. Technical justification is required for “use-as-is” or “repair,” and “as-built” records must reflect the change. Reworked items shall be inspected, tested, or reviewed in accordance with the original requirements. Repaired items shall be inspected, tested, or reviewed in accordance with alternate requirements approved by the original responsible organization. Replacement items, when used, shall be inspected, tested, or reviewed in accordance with the above dispositions.

Personnel responsible for analyzing and dispositioning nonconforming items, services, and processes shall have previously demonstrated adequate technical understanding of the area in which they are working and have access to pertinent background information concerning the nonconforming items, services, and processes.

3.2.2 Corrective Action

Nonconformances that have a negative impact on quality shall be identified and preventive action taken to eliminate potential causes of nonconforming conditions. Criteria for determining the importance or significance of the problem and the extent of cause analysis shall be developed so that actions can be taken that are commensurate with the importance of the fault or nonconformance. Corrective actions shall be tracked and completion verified.

All project personnel shall have sufficient freedom and authority to identify nonconforming items, services, and processes, identify and suggest improvements to work processes, and take corrective action(s) as appropriate.

3.2.3 Process Improvement and Problem Prevention

Process improvement and problem prevention data from nonconformance reports, corrective action(s), assessments, and other quality measurement processes shall be collected and analyzed, as appropriate. When sufficient data are available to determine the need for a root cause analysis, the analysis shall be performed by personnel trained in the process. Results shall be documented for further action as identified by the root cause analysis. Employees at all organizational levels shall participate in quality improvement, either individually or in teams, to improve process or product quality.

3.2.4 Quality Assurance Program Status

Reports to project management on the status and effectiveness of the TWRS-P Project QAP shall be prepared by the TWRS-P Project QA Manager. These reports are one of the mechanisms used for ensuring that management is informed of quality program status. These reports shall identify areas of concern, opportunities for quality improvement, and quality trends through a clearly established reporting channel. Reports shall be distributed to project management, project supervisors, and BNFL Inc. Corporate management. The Project QA Manager may schedule meetings with project personnel to review program status when necessary to discuss specific TWRS-P Project QAP activities.

3.3 RESPONSIBILITIES

Every individual is responsible for the quality and improvement of quality for his/her own work. The TWRS-P Project personnel are responsible for defining improvement standards for work products and processes and identifying nonconforming items, services, and processes.

The TWRS-P Project Manager is responsible for approving improvement standards for work products and processes and implementing the project quality improvement process. The Project Manager also is responsible for the approval of the correction of nonconforming conditions.

The Project Manager and the Project QA Manager are responsible for establishing processes for, and creating an environment conducive to taking appropriate corrective action(s) for identified problems.

The Project Technical Manager and Area Project Managers are responsible for providing direction to engineering personnel in the corrective action process and disposition of nonconforming conditions.

The Project QA Manager is responsible for implementation of the nonconformance control system and the corrective action tracking system. The Project QA Manager also has the responsibility of reviewing the proposed dispositions of nonconforming conditions and verification of satisfactory corrective actions.

4.0 DOCUMENTS AND RECORDS

4.1 PURPOSE

The purpose of this section is to establish requirements for controlling documents, including changes, to ensure that the correct information is used in performing work activities, and to establish a records system that provides sufficient evidence of the quality of activities performed.

4.2 REQUIREMENTS

Documents shall be prepared, reviewed, approved, issued, used, and revised to prescribe processes, specify requirements, or establish design. A master list shall be established to identify the current revision of controlled documents to preclude the use of nonapplicable or superseded documents. Records contain information that is retained for its expected future value and shall be specified, prepared, reviewed, approved, and maintained.

The process shall be established and implemented to ensure that sufficient records (for example, records of design, environmental conditions, applied research and development, procurement, construction, data acquisition, assessments, inspection, testing, maintenance, and modification) are specified, prepared, reviewed, approved, and maintained to accurately reflect completed work. The maintenance of records shall include provisions for retention, protection, preservation, traceability, accountability, and retrievability.

4.2.1 Documents

“Document” means recorded information that describes, specifies, reports, certifies, requires, or provides data or results. Documents are used to plan and control systems, projects, and work. Documents shall include information as appropriate to the work to be performed.

The TWRS-P Project management shall ensure that the quality system documents (e.g., QAP, procedures, design documents) are reviewed for adequacy, approved for release by authorized personnel, and distributed to and used at the location where the work is being performed.

Documents, including revisions, shall be reviewed by appropriate personnel for conformance with technical requirements and quality system requirements and approved for release by authorized personnel. Project personnel who review and approve documents shall have access to pertinent background information on which to base their reviews.

Changes to documents prescribing quality-affecting activities shall be reviewed and approved by the same organization that performed the original review and approval. The project document control process shall provide for the controlled distribution of documents and identification of recipients and actions required when documents are revised, become obsolete, or are superseded. Documents shall be reviewed and revised, as required, to reflect the correct work practices.

The types of documents requiring controlled distribution include, but are not limited to, the

following:

- QAP and its Implementation Plan
- Radiological, Nuclear, and Process Safety Documents
- Project Plans
- Project Procedures
- Interface Control Documents
- Design Drawings
- Specifications
- Construction Drawings.

The document control process shall be described in TWRS-P Project implementing procedures.

4.2.2 Records

“Record” means an authenticated document or other media that furnishes evidence of a function, policy, decision, procedure, or other essential transaction. Records shall be identified, specified, prepared, reviewed, approved, and maintained in accordance with project procedures.

Records shall be legible, accurate, dated (including revision date), paginated, readily identifiable to the product or service involved, complete, and maintained in an orderly manner. Records and documentation may be stored via hard copy, electronically, or magnetically, and they must be readily retrievable.

Records shall be prepared in accordance with policies and/or procedures governing their preparation and shall be retained for periods identified in the records retention requirements for the project.

The records management process shall be described in TWRS-P Project implementing procedures.

4.2.3 Storage and Maintenance

Rules governing access to and control of the files, including a list designating personnel with access to the files, shall be established and approved by the Project Manager.

Measures shall be established and documented in project procedures to preserve the integrity of storage facilities and media.

A Files Maintenance system shall be used to file the project documents and records. A Records Inventory and Disposition Schedule system shall be used to set forth mandatory disposition in terms of disposal or transfer to storage or the client after specified retention periods in the office.

A records retention and turnover plan shall be prepared to address requirements provided in the NQA-1 supplement 17S-1 “Supplementary Requirements for Quality Assurance Records,” 10 CFR 830.120, or other applicable standards.

4.3 RESPONSIBILITIES

The TWRS-P Project Administration and Controls Manager is responsible for developing and implementing procedures to address document control and records management.

The TWRS-P Project File Custodian is responsible for maintaining a document control and records management system in accordance with written procedures.

5.0 WORK PROCESS

5.1 PURPOSE

The purpose of this section is to establish the TWRS-P Project requirements and responsibilities to control work processes, equipment, and conditions that affect the quality of services and products.

5.2 REQUIREMENTS

Work activities shall be performed in accordance with established technical standards and administrative controls. All activities affecting quality shall be prescribed by, and performed in accordance with, documented instructions, procedures, or drawings. Such documents shall include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been accomplished satisfactorily.

Work planning for project activities is performed by the functional groups that include engineering, procurement, construction, administration, operations, and project controls, for their areas of expertise and by field organizations for project-specific activities. Field work is accomplished by the construction organization either directly or through subcontracts.

Work processes are accomplished through the following:

- Performance of work to approved procedures
- Design process control
- Control of materials and items to ensure their proper use and to prevent damage, loss, or deterioration
- Maintenance and use of calibrated measuring and test equipment
- Conduct of Operations
- Control of procurements.

TWRS-P work performance shall be specified in approved work planning documents, controlled manuals and procedures, and approved operating and administrative procedures. Special processes shall be performed in accordance with approved procedures prepared by the organization responsible for certifying/qualifying the process, equipment, and personnel.

5.2.1 Use of Instructions and Procedures

Processes that affect quality shall be conducted under controlled conditions using approved instructions, procedures, checklists, and other appropriate means. The procedures and instructions shall be prepared at a level of detail appropriate for the importance and complexity of the work process being performed.

Implementation of the QAP is accomplished by direct application of the policies contained in this manual, application of corporate and department procedures, project procedures, and instructions.

Project-specific instructions and procedures shall be prepared as required and made available

to project personnel. Numbering and revision indications shall be provided to ensure that current requirements are implemented.

Revisions to instructions and procedures shall be approved by the same level of management that approved the original issuance of the documents.

5.2.2 Identification and Control of Items

5.2.2.1 Identification. Identification shall be maintained either on the items or in documents traceable to the items. Identification shall be indicated by one or more of the following.

- Physical identification shall be used to the maximum extent possible.
- Where physical identification on the item is either impractical or insufficient, physical separation, procedural control, or other appropriate means shall be employed to ensure positive identification.
- Identification markings, when used, shall be applied using materials and methods that provide clear and legible identification and do not detrimentally affect the function or service life of the item.
- Indication of inspection/test status of items shall be maintained as appropriate throughout fabrication, assembly, storage, shipping, installation, erection, and operation of the item.
- Markings shall be transferred to each part of an identified item when subdivided and shall not be obliterated or hidden by surface treatment or coatings unless other means of identification are substituted.
- Markings used to identify items shall be evaluated for compatibility with the environment to which they will be exposed (e.g., radiation, temperature, weather) as well as the chemical composition of the material to ensure that the function or service life of the item is not detrimentally affected, and to avoid contamination of samples.
- Markings that become obliterated shall be restored immediately.

5.2.2.2 Identification Methods. Items of normal production (e.g., batch, lot component, parts) requiring traceability shall be identified and physically segregated, as necessary, from initial receipt up to and including installation or consumption. This identification shall relate an item to a specifying document (e.g., specification, procedure, test result) to provide objective evidence of compliance with requirements.

5.2.2.3 Traceability. Item identification or traceability provisions shall be provided when specified by codes, standards, or specification. Traceability requirements include, but are not limited to, identification or traceability of the item to applicable specification, material grade,

heat, batch, lot, sample, part, or serial number. For items with traceability requirements, the traceability and identification markings shall be applied using materials and methods that provide clear and legible identification and are not detrimental to the function or service life of the item.

When items with established traceability requirements are subdivided, the identification necessary to retain traceability shall be transferred to each part, item, data, or sample at the time of subdivision (e.g., subdivision of samples, dividing contents of boxes of sample containers).

5.2.2.4 Control of Items with Limited Shelf Life. Items with limited calendar or operating life shall be physically identified with the shelf or operating life expiration date, and shall be stored and issued so that the oldest dated items are issued first, provided sufficient operating life remains so that early replacement will not be required. When the established shelf or operating life has expired, the item shall be marked prominently to preclude inadvertent use and shall be removed from the controlled storage area. The expired item shall be reported to the requesting organization, so that the item can be disposed of properly. Such items shall be discarded or identified for training purposes only.

5.2.2.5 Storage. Items not installed shall be stored in an area of controlled access. Access restriction shall be specified by the person responsible for the item. Storage area inspections shall be scheduled and documented to ensure that the physical identification is legible, accessible, secure, and readily identifiable. Status indicators shall be changed or removed by the issuing organization only, or as described in procedures approved by that organization. Items that are stored for future use or archived for historical purposes shall be protected against physical damage or loss.

5.2.3 Control of Special Processes

Special processes such as: welding, nondestructive examination, heat treating, and chemical cleaning, shall be controlled. Special processes that control or verify quality shall be performed by qualified and certified personnel using qualified procedures in accordance with specified requirements.

Special process procedures or instructions shall contain the following:

- Codes, standards, and specification applicable to the process
- Identification of the organizations responsible for development and qualification of the procedure for the process activity
- Acceptance criteria
- Ambient condition requirements as defined by the applicable procedures, specification, codes, and/or standards
- Qualification and/or certification requirements for procedures, equipment, and personnel

- Equipment and/or calibration requirements

- Parameters and attributes for which verification and/or documentation is required.

Special process procedures shall be developed and qualified as required by the applicable code, standard, or specification for the process and approved by the appropriately designated specialists.

Personnel preforming or controlling special processes shall be qualified. When required by the controlling code, standard, or specification, they also shall be certified.

Certification records for individuals who perform or control special processes shall include results of a written proficiency examination, and/or results of a practical examination in which the process was performed, which shall be evaluated by a qualified and certified examiner.

Equipment and instrumentation used in the performance of special processes shall be controlled and calibrated or qualified necessary.

Special processes controlled by automatic equipment shall be qualified in accordance with approved procedures. The qualification shall provide objective evidence of acceptable process control and repeatability. Required documentation shall be described in implementing procedures.

Operators for automatically controlled special processes must be qualified. Certification is not necessary unless specifically required by the controlling specification, code, or standard. Operator qualification requirements shall be defined in the implementing procedure or instruction for the process.

Scientific investigations shall be planned and coordinated with organizations providing input to or using the results of the investigation. Scientific investigations shall be performed using scientific notebooks, implementing documents, or a combination of both.

Requirements unique to work conducted for the processing of HLW shall be implemented as described in the specific sections or supplements of the DOE/RW/0333P.

5.2.4 Control of Measuring and Test Equipment

Measuring and inspection tools, gauges, instruments, and other measuring and testing devices shall be calibrated and adjusted at specific periods to maintain accuracy with specified limits. Calibration shall be performed using standards traceable to the National Institute of Standards and Technology, or other nationally or internationally recognized standards, or a method that gives the basis for the calibration.

Quality control procedures shall provide for controls that include the following:

- Controlling newly procured measuring equipment to ensure that the equipment is properly identified, calibrated, and a calibration frequency is established

- Identifying each device with a unique marking
- Segregating equipment found to be out of calibration until recalibration is performed
- Requirements that equipment is placed into controlled storage as necessary to maintain calibration accuracy
- Selecting or approving the selection of measuring equipment compatible with the type and accuracy requirements of the operations to be performed
- Verifying controlled issue of measuring and test equipment
- Recalling equipment for calibration before the expiration date of the current calibration
- Performing calibration in an environment appropriate to the type of equipment
- Application of calibration status indicators (labels) on equipment
- Maintaining calibration records including manufacture's calibration data
- Evaluating the services of calibration laboratories when used
- Dispositioning items or materials that become suspect when the measuring and testing devices used are found to be out of calibration tolerance.

Project procedures or instructions shall be prepared to provide for the training of workers performing calibration. The training program shall include training for personnel that maintain such equipment.

5.2.5 Handling, Storage, and Shipping

Handling, storage, and shipping of items shall be controlled to prevent damage or loss and to minimize deterioration. Handling, storage, and shipping of items shall be conducted in accordance with established work and inspection instructions, drawings, specifications, shipment instruction, or other pertinent documents specified for use in conducting the activity.

When requirements for special handling, storage, and shipping are outlined in specifications, these requirements shall be reflected in implementing procedures.

When required for particular items, special equipment (e.g., containers, radiographic equipment, survey instruments) and special protective environments (e.g., inert gas atmosphere, specific moisture content levels, temperature levels) shall be provided, and the conditions verified. Special protective environments shall be applied to items based on their sensitivity to environmental conditions, resistance to physical forces, relative irreplaceability, and importance to end use. The following shall be considered in determining the handling, storage, and shipping requirements: blocking, bracing, choking, strapping, and orientation; cleaning, containment, and confinement; desiccants; environment (e.g., dust, dirt, water,

sunlight, salt spray); in-storage inspection, maintenance, and testing; lifting points and methods; packaging; preservation; recording devices (e.g., temperature, pressure, humidity, loading); sealing and coatings; transportation methods; and inert blanketing.

- Shipping - Shipping of items shall be conducted in accordance with established work instructions, drawings, and specifications by appropriately assigned project personnel. The responsible personnel shall ensure that appropriate documentation (e.g., forms, labels, property release forms) is prepared and, if required, signed by the appropriate person(s). The shipping documentation will accurately reflect specific traceability to the items being shipped.

- Storage - Controlled access areas shall be established for storage of critical, sensitive, perishable, or high-value items before use or shipment. The project personnel shall document all movement of such items into, from, or within the designated storage areas.

- Packaging - Packaging requirements shall be specified for the protection of item(s) against corrosion, contamination, physical damage, or any effect that would lower the quality of an item or cause an item to deteriorate during the time it is handled, stored, and shipped.

5.3 RESPONSIBILITIES

The TWRS-P Project Manager and Project QA Manager are responsible for the implementation of work process arrangements across the project organization.

The TWRS-P Project Manager has the following responsibilities:

- Ensures that personnel are provided with necessary training, suitable working environment, and administrative controls to accomplish work processes

- Reviews and assesses work and related information to ensure that the required quality is being achieved and to identify processes that require improvement.

The TWRS-P Project Technical Manager has the following responsibilities:

- Ensures the preparation, review, and approval of work process instructions and procedures
- Provides for the qualifications of instructors necessary to administer training to the project personnel.

The TWRS-P Project QA Manager has the following responsibilities:

- Monitors processes that affect quality to ensure that specified requirements are met and processes conform to documented procedures

- Ensures, through assessment and surveillance, that work processes are performed according to these requirements and implementing procedures and instructions

- Reviews procedures developed for identification and control of items, maintenance and preservation of items, and calibration and maintenance of equipment

- Ensures that measuring and test equipment is maintained according to documented procedures, and that maintenance records are maintained, including records of any damage, malfunction, modification, or repair.

Project personnel have the following responsibilities:

- Follow approved procedures and processes

- Report to appropriate management those processes believed to be in nonconformance with applicable requirements, or that can be improved to reduce costs or improve quality.

6.0 DESIGN

6.1 PURPOSE

The purpose of this section is to establish the TWRS-P Project requirements and responsibilities to control and verify design activities including design inputs, design outputs, configuration and design changes, documentation, records, and technical interfaces consistent with the results of the graded approach.

6.2 REQUIREMENTS

A process shall be established and implemented for design using sound engineering and scientific principles and appropriate standards. Provisions shall include the control of design requirements, inputs, processes, outputs, changes, records, and organizational interfaces.

Design input, such as design bases and safety and technical requirements, shall be correctly translated into design output, such as specifications, drawings, procedures, safety analysis, and instructions.

6.2.1 Conformance to DOE-RL Top-Level Safety Standards and Principles

The TWRS-P Project Team is committed to complying with the following principles:

- QA and quality control shall be applied to activities affecting quality of work as part of a comprehensive system to ensure with high confidence that all items delivered, services, and tasks performed meet required standards.

- The BNFL Team shall use well-proven and established techniques and procedures supported by Quality Assurance System (QAS) elements to achieve high quality during all phases of the project.

- Formal configuration management shall be applied to all facility activities during the program's lifetime to ensure that programmatic objectives, including safety, are fully achieved. Work shall be performed and controlled according to approved plans and procedures that clearly delineate responsibilities.

- A system shall be developed and used to control and maintain accurate as-built drawings for Important-to-Safety SSCs during the life of the facility. The facility shall be designed for a set of events such as normal operations, including anticipated operational occurrences, maintenance, and testing; external events; natural phenomena; and postulated accidents.

- Hazard and accident analyses shall be carried out as required to evaluate the safety performance of the design and identify requirements for operations.

6.2.2 Design Input

Design inputs shall be technically correct and complete. Essential design inputs shall be identified, reviewed, and approved by the responsible engineering group. Changes from specified design inputs, including the reasons for the changes, shall be identified, approved, documented, and controlled. When design inputs are another organization's design output, the responsible design organization shall obtain evidence (e.g., design review reports, certification) that the originating organization has completed verification of its design output documents.

Design inputs shall be specified on a timely basis, to the level of detail necessary to permit the design activity to be carried out in a correct manner, and to provide a consistent basis for making decisions, accomplishing design verification measures, and evaluating design changes.

6.2.3 Design Process

The design process includes the preparation, review, comment, resolution of comments, and translation of the design input into a set of appropriate procedures, specifications, drawings, calculations, reports and other design documents. The process includes documented design analyses and design verification.

Procedures shall be prepared by the TWRS-P Project design organization and issued to guide and control design activities. These procedures provide for appropriate levels of review, checking, and approval for specified aspects of design and engineering work. These procedures identify design aspects that include the following:

- Preparation of design documents by qualified personnel
- Checking of engineering documents by personnel with technical qualifications comparable to the originator
- Review and approval of documents by supervisors
- Measures to preclude the use of unverified design data and ensure that appropriate verification or qualification testing is completed before design data are used
- Review, as required by applicable QL requirements, by independent specialists of design documents such as drawings, calculations, and safety analysis for Important-to-Safety SSCs
- Control of design changes.

The design process shall identify Important-to-Safety SSCs.

Design provisions shall be included to prevent the loss of safety functions due to damage to Important-to-Safety SSCs resulting from a common-cause or common-mode failure. Important-to-Safety SSCs shall be designed and qualified to function as intended in the

environment associated with the events for which they are intended to respond.

Computer software used during the design process for Important-to-Safety SSCs shall be verified and validated. Software verification and validation activities shall ensure the following:

- Software adequately and correctly performs all intended functions
- Software does not perform any unintended function that either by itself or in combination with other functions can degrade the entire system.

Computer software verification and validation activities shall be conducted in accordance with the approved TWRS-P Project procedure.

Software verification and validation activities shall be planned and performed for each system configuration that may impact the software. The results of software verification and validation activities shall be documented.

6.2.4 Configuration Management

Configuration Management shall be introduced from the outset of design through engineering procedures that control the status and flow of engineering and design information. These procedures, supported by the project schedule logic, shall ensure that design activities do not commence until appropriate design criteria have been established. The procedures also shall include arrangements to ensure that ongoing design changes are formally statused and promulgated throughout the design organization to ensure consistent system integration and configuration control. The procedures shall include allocation of specific responsibility for approval of design output documents and design change documents.

6.2.5 Design Interfaces

Design interfaces shall be identified and controlled. The design effort shall be coordinated among participating organizations both internal and external.

Internal interface controls shall include the assignment of responsibilities and the establishment of procedures among project team members, functional organizations, and support groups.

External interfaces shall include the DOE, DOE's contractors, and other organizations providing support to the project.

Engineering procedures or project plans shall provide for interface controls that include the following:

- Defining and documenting the interacting disciplines and organizations and their roles with respect to design reviews, design-basis exchange, deliverables among disciplines and organizations, and associated approvals
- Systems that avoid or identify and correct conflicts.

6.2.6 Design Output

The completed design shall be recorded in design output documents such as drawings, specifications, test/inspection plans, maintenance requirements, and reports. The administrative interface process shall clearly indicate responsibilities for design output document activities including as-built mark-up and updating during project construction, document control, and records management.

6.2.7 Design Verification

Design verification shall be performed commensurate with the QL requirements associated with a SSC.

Design verification shall be performed for Important-to-Safety SSCs by qualified individuals or groups other than those who performed the original design, though they may be from the same organization. Design verification shall not be performed by the responsible supervisor unless the following conditions are met:

- The supervisor did not specify a singular design approach or the supervisor did not rule out certain design consideration
- The supervisor did not establish the design inputs
- The supervisor is the only individual competent to perform the verification.

Design verification methods shall include but not be limited to design reviews, alternate calculations, independent peer reviews, and qualification testing. Separate verification may not be needed for multiple uses of identical previously proven designs, unless they are intended for different applications or different performance requirements.

Design verification shall be completed before design output is used by other organizations or to support other work, such as procurement, licensing, manufacturing, construction, or operations. When this timing cannot be achieved, the unverified portion of the design shall be identified and controlled. In all cases, design verifications shall be completed before the item being relied on to perform its function and before installation becomes irreversible to the extent of requiring rework.

6.2.8 Design Changes

Changes to final design, field changes, modifications, and nonconforming items dispositioned “use-as-is” or “repair” shall be justified and subject to controlled measures commensurate with those applied to the original design. This control shall include assurances that the design and safety analysis of the items are still valid. Temporary modifications shall receive the same levels of control as the permanent modifications.

6.3 RESPONSIBILITIES

The TWRS-P Project Manager is responsible for ensuring the adequacy of the arrangements

implemented by the project team members regarding the design and supporting activities.

The TWRS-P Project Technical Manager is responsible for the overall design control process including the following:

- Establishing interface controls for design and data collection activities
- Ensuring that data collected during technology development process, which may be used as design inputs, are obtained and controlled in accordance with this part
- Documenting and approving design plans
- Establishing a plan for independent verification of design products
- Ensuring that design changes are documented and approved.

The TWRS-P Area Project Managers are responsible for the following:

- Ensuring that design control procedures are established and implemented for the performance and control of design activities
- Performing design activities in accordance with approved project procedures
- Verifying that design and technical reviews are conducted in accordance with the requirements of this part.

The TWRS-P Project QA Manager is responsible for reviewing design plans before their approval to verify incorporation of appropriate QA provisions and compliance to procedures. Specifically, the QA manager is responsible for the following:

- Assessing the design control process to ensure the adequacy and satisfactory implementation of the design procedures
- Participating in design reviews, as required
- Reviewing results of technical and design reviews for compliance with QAP requirements
- Evaluating subcontractors design control programs.

7.0 PROCUREMENT

7.1 PURPOSE

The purpose of this section is to establish the TWRS-P Project requirements and responsibilities for ensuring that purchased items and services adhere to specified requirements and perform as expected.

7.2 REQUIREMENTS

Items and services shall be procured by issuing documents that include acceptance criteria and specify appropriate technical and quality requirements as well as the methods to resolve unsatisfactory quality, such as nonconformances.

A QL designation shall be assigned to each procurement by the individual responsible for processing the procurement documents in accordance with this QAP. All procurement documents for designated QL-1 or QL-2 SSCs and related services shall be reviewed by the QA staff before issuance.

Suppliers of QL-1/QL-2 items and services initially shall be evaluated to determine whether the supplier has the requisite QASs to support the procurement. This evaluation may be performed by reviewing the suppliers' quality documentation, facilities, history, and/or by using reports of other recognized industry organizations. Suppliers of QL-1/QL-2 items and services shall be monitored at least every 3 years.

Procurement planning shall be accomplished as early as practicable to ensure interface compatibility and a uniform approach to the procurement process.

7.2.1 Procurement Documents

Design criteria, and other design requirements necessary to ensure adequate quality is achieved, shall be included in procurement documents. To the extent determined necessary by the project and the assigned QL of the item being procured, procurement documents define and provide requirements for suppliers/subcontractors to implement a QAS. The QAS implemented by suppliers/subcontractors shall incorporate applicable requirements of 10 CFR 830.120 and applicable consensus standards, as specified for the procurement. The QAS requirements are specific to the item or service procured, and also may involve imposition of special requirements.

Project engineering transmits to project procurement the design documents to be included in purchase orders and contracts. Procurement documents shall include requirements for special processes to be performed and documented as follows:

- Qualification of process procedures and qualification and certification of special process personnel

- Submittal of special process procedures and results for review by project engineering

- Notification to purchaser of nonconforming items.

The procurement documents shall specify the method to be used for accepting the item or service. Typical methods include the following:

- Reviewing manufacturing process controls
- Shop inspections
- Source verifications
- Receipt inspection
- Pre- and post-installation tests
- Certificates of conformance.

The item or service shall not be used or placed into service until all acceptance criteria have been satisfied.

Procurement documents also shall include requirements for the use of measuring and test equipment, as well as for handling, storage, and shipping.

Procurement document changes shall be subject to the same review and approval process as required for the preparation of the original document.

7.2.2 Supplier Qualification

Qualified suppliers shall be identified early in the design and procurement process. The prospective suppliers shall be evaluated to verify their capability to meet quality requirements. The suppliers shall be qualified on the basis of one or more of the following criteria:

- Past performance for identical or similar items/services
- Demonstrated capability or documented experience of users
- Objective evidence of quality supplied by vendors.

BNFL Inc. shall establish and maintain an Approved Suppliers List for the TWRS-P Project.

7.2.3 Supplier Monitoring

Supplier monitoring may include the following elements:

- Audits or quality surveillances

- Review of plans and progress reports

- Processing of change information

- Review of supplier's supporting documents for the product supplies (e.g., calculations, drawings, analyses)

- Review and disposition of nonconformances.

Audits of a supplier shall be conducted based on the complexity and importance of an item or service and/or results of performance analyses such as assessments and reliability, availability, and maintainability studies. An audit may be conducted to evaluate the supplier's QAS implementation and to provide additional confidence that the supplier is adhering to specifications and applicable QA requirements.

7.3 RESPONSIBILITIES

The TWRS-P Project Manager is responsible for ensuring through procurement planning that the statement of work and scope of work define the work to be accomplished and related technical, administrative, and QA requirements are specified.

The TWRS-P Area Project Managers are responsible to ensure QL designation identifier on procurement documents.

The TWRS-P Project Procurement Manager is responsible for the preparation of the final procurement documents package and for ensuring that suppliers are qualified to provide required items and services as specified.

The TWRS-P Project QA Manager is responsible for the following:

- Reviewing procurement documents related to Important-to-Safety SSCs

- Performing, coordinating and/or assisting in supplier reviews, audits, and assessments

- Maintaining records of supplier reviews, audits, and assessments conducted by TWRS-P Project QA and technical personnel

- Maintaining the TWRS-P Project Approved Suppliers List.

The Contracts Manager is responsible for contractual interfaces related to financial, quality, and legal matters.

8.0 INSPECTION AND ACCEPTANCE TESTING

8.1 PURPOSE

This section defines the requirements and responsibilities for the control of the inspection and test activities to verify conformance of items, services, and processes to specified requirements. The controls include provisions for preventive maintenance and calibration programs to ensure that Important-to-Safety SSCs continue to meet design requirements throughout the life of Hanford waste treatment facilities and that equipment used for inspections and tests are calibrated and maintained.

8.2 REQUIREMENTS

The TWRS-P Project inspection activities shall be conducted in accordance with the principles stipulated by the U.S. Department of Energy, Richland Operations Office (DOE-RL) top-level safety standards and principles, as follows:

> "Structures, systems, and components Important-to-Safety should be the subject of appropriate, regular preventive maintenance, inspection, and testing and servicing when needed, to ensure that they remain capable of meeting their design requirements throughout the life of the facility. Such activities should be carried out in accordance with written procedures supported by quality assurance measures" (DOE/RL-96-0006, Rev. 1, Section 4.3.5.1).

8.2.1 Inspection

Inspections required to verify conformance of items, services, and processes to specified requirements shall be planned and the results documented on inspection reports. Characteristics to be inspected and inspection methods to be employed shall be specified. Inspection results shall be documented in inspection reports and in Nonconformance Reports, as needed. Inspection for acceptance shall be performed by persons other than those who performed or supervised the work being inspected.

Through procurement documents and implementing procedures, inspections and tests shall be planned in order to verify conformance of products, items, processes, designs, and computer programs or to demonstrate satisfactory performance of a service received.

8.2.1.1 Inspection Methods. Quality control instructions shall be prepared by construction or operations personnel to describe the items and characteristics to be inspected as well as the method to be used for performing and documenting the inspection.

The basis for preparing the quality control instructions includes the design documents and applicable national codes and standards specified in the design. Inspection witness and hold points shall be established when appropriate. The type and extent of inspection and testing shall depend on QLs and on the type of process, product, or service and where appropriate, on the record of a supplier's previously demonstrated performance.

8.2.1.2 Receiving Inspection. Quality-affecting process items, products, and services shall be verified according to procurement documents and/or inspection and test plans to ensure conformance to specified requirements. Incoming products or services shall not be used until they have been verified as conforming with specified requirements. Incoming products that require inspection, laboratory, or physical testing shall be segregated until the inspection and testing results confirm the acceptance criteria or are otherwise dispositioned if found to be nonconforming. Items and products pending inspection or acceptance testing shall be identified with “HOLD” tags, or other equivalent means.

8.2.1.3 In-Process Measurement, Inspection, and Verification. The TWRS-P Project procedures or work instructions shall specify the quality characteristics to be measured, inspected, or verified during all phases of the project, as appropriate. These procedures and instructions shall identify any mandatory hold points requiring verification of quality characteristics of an item or process.

8.2.1.4 Qualification and Certification of Inspection Personnel. Personnel performing inspections, examinations, and tests for quality verification activities shall be qualified, and when specified by code, certified. These individuals shall have the freedom and responsibility to report nonconforming items, services, products, and processes.

Personnel performing, evaluating, and supervising nondestructive examinations shall be qualified and certified in accordance with applicable national consensus codes and standards. Certifications shall be documented and maintained current.

8.2.1.5 Final Inspection. Final verifications and inspections of completed products and services shall be conducted according to procedures to ensure conformance to specified requirements.

8.2.2 Test Control

Tests required to demonstrate that items will perform satisfactorily in service shall be planned and executed in accordance with approved test procedures. Characteristics to be tested and test methods to be employed shall be specified. Test results shall be documented and their conformance with acceptance criteria shall be evaluated and nonconformances documented.

8.2.2.1 Test Requirements. Test requirements and acceptance criteria shall be provided or approved by the organization responsible for the design of the item to be tested unless otherwise designated. Test requirements and acceptance criteria shall be documented in test plans or procedures and shall be based on specified requirements contained in applicable design or other pertinent technical documents.

8.2.2.2 Test Procedures. Test procedures shall include or reference test objectives and make provisions for ensuring that prerequisites for the given test have been met, adequate instrumentation is available and used, necessary monitoring is performed, and suitable environmental conditions are maintained. Prerequisites include: instrumentation calibration, use of appropriate equipment, qualification of personnel and training if needed, acceptable condition of test equipment and item to be tested, and suitable environmental conditions. Test procedures shall be reviewed and approved by the Project Manager or designee.

In lieu of specifically prepared written test procedures, appropriate sections of related documents, such as American Society for Testing and Materials methods, supplier manuals, or equipment maintenance instructions may be used. Such documents shall include adequate instructions to ensure the required quality of work.

8.2.2.3 Test Results. Test results shall be documented and evaluated by responsible and qualified personnel to ensure that test requirements have been met.

8.2.3 Control of Measuring and Test Equipment

Tools, gauges, instruments, and other measuring and test equipment used to determine acceptance of items, products, or processes shall be controlled and, at specified periods, calibrated and adjusted to maintain accuracy within necessary limits. Measuring and test equipment shall be uniquely identified and traceable to nationally recognized standards. Where such standards do not exist, the basis used for calibration shall be documented.

8.2.4 Identification of Inspection and Test Status

The status of inspection and test activities shall be identified either on the items or in documents traceable to the items where it is necessary to ensure that required inspections and tests are performed and to ensure that items that have not passed the required inspections and tests are not inadvertently installed, used, or operated.

- Status shall be maintained through indicators, such as physical location and tags, markings, shop travelers, stamps, inspection records, or other suitable means.

- Procedures shall be established to indicate, by the use of markings, the status of inspections and tests on individual items.

- Status indicators also shall provide for indicating the operating status of systems and components of the facility to prevent inadvertent operation.

The application and removal of tags, markings, labels, and stamps shall be strictly controlled to ensure that only authorized personnel remove status indicators. Authority for removal of status indicators shall be clearly specified in approved program implementing procedures.

When it is necessary to alter the sequence of required inspection or test activities, the responsible organization shall ensure that either waivers are obtained and approved for deviation from the sequence specified in approved instructions, procedures, and drawings, or that a new procedure is established and approved to control the alteration of the sequence.

8.2.5 Records

Information related to the control of inspection and test activities and calibration of measuring and test equipment shall be designated quality records and maintained in accordance with Section 4.0 of this QAP.

8.3 RESPONSIBILITIES

The TWRS-P Project Technical Manager is responsible for establishing required inspection and test activities including approval of inspection and test plans, inspection checklists and test procedures, and ensuring that inspection and test results fulfill specified requirements.

The QA Manager is responsible for verifying that inspections and tests are planned, performed, controlled, and documented in accordance with approved procedures and that inspections and tests are performed by qualified personnel.

9.0 MANAGEMENT ASSESSMENT

9.1 PURPOSE

To define requirements for conducting management assessments used for identifying, correcting, and preventing management problems that hinder the achievement of the organization's objectives.

9.2 REQUIREMENTS

Assessments are an important step in the Plan-Do-Check-Act cycle. As such, they can add value to products and services by linking management and the conduct of work to meaningful improvement actions. DOE Guide G414.1-1 provides information concerning the establishment and implementation of effective assessment processes.

The TWRS-P Project Manager has the responsibility for planning, scheduling, and ensuring performance of the management assessment of project activities. The TWRS-P Project management assessments focus on evaluating the effectiveness of the management system and identifying management problems that could hinder the TWRS-P Project in achieving objectives in accordance with quality, safety, and environmental requirements. Management assessments also address the effectiveness of leadership.

Management assessments shall be performed and documented in accordance with written procedures. Results of management assessments shall be documented and reported to the assessed organization's management and senior management.

Management systems and processes reviewed during management assessments include strategic planning, project interfaces, cost controls, use of performance indicators, staff training and qualification, and supervisory oversight and support. Management assessment also includes the evaluation of the adequacy of resources and personnel provided to achieve and ensure quality. Review criteria are established for each management assessment element.

Assessment methods include direct observation of work in process, personnel interviews, and review of documentation. Documentation reviews may include specific deliverables, results of independent assessments, results of project reviews and readiness reviews, functional oversight reports prepared and issued by BNFL Inc. management, and assessment reports issued by the DOE-RL. Management assessment reports are prepared detailing the review methods and results. For findings, observations, and recommendations for improvement, responsible personnel and completion dates shall be identified, and actions shall be tracked to completion.

Management shall conduct and document follow-up evaluation of actions taken to determine the effectiveness of the respective action. Management assessments shall be conducted periodically based on project schedule. The maximum period between management assessments should not exceed 12 months. The responsibility to conduct assessments shall not be delegated, and the direct participation of each manager is required.

9.3 RESPONSIBILITIES

The TWRS-P Project Manager is responsible for planning an annual review of the overall effectiveness of the project quality system and quality policies. The TWRS-P Project Manager retains the overall responsibility for management assessments.

The TWRS-P Project Technical Manager and Area Project Managers have the responsibility to identify and document performance problems and conditions adverse to quality, as well as opportunities for quality improvement and shall take prompt action to resolve problems, deficiencies, and improve processes and quality.

The TWRS-P Licensing and Permitting Manager is responsible for providing direction on the development of the regulatory framework and for identifying deficiencies in the implementation of regulatory-related project documents.

The TWRS-P Project Controls Manager is responsible for monitoring project expenditures and reporting the project progress and performance. The TWRS-P Project Controls Manager also is responsible for identifying deficiencies related to project performance and providing solutions for those deficiencies.

The TWRS-P Project QA Manager shall evaluate the effectiveness of management assessments and establish the emphasis of future management assessments. The TWRS-P Project QA Manager also shall provide reports to BNFL Inc. corporate QA management pertaining to the status of management assessment activities, including the correction of deficiencies and application of lessons learned to the project quality management system.

When the evaluation of the indoctrination and training programs identifies deficiencies, the responsible manager is required to respond in writing within 30 days indicating the appropriate corrective action.

10.0 INDEPENDENT ASSESSMENT

10.1 PURPOSE

This section establishes the responsibilities and requirements for planning and conducting independent assessments to measure the adequacy of work performance and to promote quality improvement.

10.2 REQUIREMENTS

The following related top-level safety standards and principles stipulated by the DOE-RL shall be taken into consideration in conducting independent assessments:

> "Internal safety review procedures should be used by the Contractor to provide a continuing surveillance and audit of facility operational safety and to support the facility manager in overall safety responsibilities" (DOE/RL-96-0006, Rev. 1, Section 4.3.1.5).

and

> "The Contractor should establish a framework for its safety review organizations that are responsible for assuring the safety of the facility. The separation between the responsibilities of the safety review organizations and those of the other organizations should remain clear so that the safety review organizations retain their independence as safety authorities" (DOE/RL-96-0006, Rev. 1, Section 4.4.1).

10.2.1 Independent Assessment

Independent assessments are a management tool used to advise and inform management of the implementation and adequacy of the quality system. Assessments determine if planned quality systems are implemented and if those systems are producing processes, products, and services that meet specified requirements.

The scheduling of independent assessments and allocation of resources shall be based on work status, relative importance to safety, and the complexity of the activity being assessed.

Independent assessment reports provide feedback to management on the status and performance of the controls established and implemented. The TWRS-P Project organization shall plan assessments to conduct the following:

- Monitor work processes to determine if specified requirements are being achieved
- Evaluate products and services being produced to determine if they conform to specified requirements

- Identify abnormal performance and potential problems
- Identify opportunities, areas, and processes that can be improved.

Independent assessments include performance of QAP audits, system audits, inspections, surveillances, and laboratory performance evaluation audits.

The QAP audits assess compliance to requirements such as those included in this QA Manual, implementing procedures, design criteria, and regulatory documents. Activities assessed include items such as process controls, preparation of deliverables, configuration and document control, and records management.

System audits assess and evaluate components of the measurement system in use to determine proper selection and use. These include evaluation of quality control systems and procedures.

Inspections include activities as described in Section 8.0 of this manual.

Surveillances of specific project activities shall be used to determine compliance of activities to program requirements. Surveillances may be scheduled or unscheduled and are to be commensurate with the scope and complexity of the activities covered. Checklists or red-lined procedures are prepared to guide the performance of surveillances. Surveillances shall be documented in surveillance reports and include the reference documents used, activities reviewed, results of the reviews, and items requiring corrective action. The QA personnel shall conduct and document surveillances of project activities, report results, provide recommendations for corrective action and improvements, and perform follow-up and verification of actions taken.

Laboratory performance evaluation audits shall include periodic evaluations to measure the performance of laboratories conducting analytical and experimental work in support of the TWRS-P Project.

10.2.2 Assessment Personnel

Personnel that conduct assessments shall not be directly responsible for the work processes and systems being assessed. Personnel that conduct assessments shall be qualified and technically knowledgeable in the subject matter assessed. The qualifications of personnel conducting assessments shall be documented. Personnel that conduct assessments shall have sufficient authority and freedom from line organizations to carry out their responsibilities. Personnel that conduct assessments shall focus on process effectiveness and quality improvement.

10.2.3 Assessment Performance

Assessments shall be planned, scheduled, and conducted according to established procedures or checklists. The types and frequency of independent assessments shall be based on the status, complexity, and importance of the activities or processes being assessed. The maximum period between independent assessments should not exceed 12 months, and

at least one assessment should be conducted early in the project life. Objective evidence shall be examined to verify that quality requirements are being effectively implemented.

10.2.4 Assessment Results and Reports

The results of assessments shall be documented and reported to appropriate levels of management within the project organization. Adequate information shall be documented so meaningful actions can be taken.

10.2.5 Management Responses and Actions

Management shall take appropriate action commensurate with the importance and severity of identified problems. Management responses to identified problems may include the following:

- Immediate action to correct a deficiency
- Root cause identification
- Actions taken to prevent recurrence
- Lessons learned shared with others in the organization
- Action taken to improve process or product quality.

Management must respond to assessment results within 30 days from receiving the report. Management responses to assessment results shall be documented.

10.3 RESPONSIBILITIES

The TWRS-P Project Manager is responsible for the following:

- Reviewing assessment, surveillance, and audit reports; investigating adverse findings and taking timely, appropriate action
- Providing the support resources needed for the assessment process.

The TWRS-P Project QA Manager is responsible for the following:

- Planning and performing assessments
- Communicating the results of assessments to BNFL Inc. QA management
- Evaluating the adequacy of management responses to assessment deficiencies and conducting follow-up evaluations to verify that corrective actions have been accomplished, as scheduled
- Tracking identified deficiencies to completion of corrective actions.

11.0 GLOSSARY

Activities Affecting Quality - All activities associated with Important-to-Safety structures, systems, and components, including but not limited to design, procurement, inspection, testing, and installation.

Administrative Controls - Provisions relating to organization and management, procedures, record keeping, assessment, and reporting necessary to ensure safe operation of a facility.

Authentication - Process of attesting to the fact that a document is accurate, complete, and satisfies the definition of a record by the person who completes and approves the document.

Deactivation - The process of permanently ceasing active operation at a facility in a planned and controlled manner to support follow-on decontamination and decommissioning activities. A process whereby non-essential systems and/or equipment in a shut down facility are de-energized, drained and flushed, isolated, or removed to minimize the long-term costs of maintaining the facility in a physically safe and environmentally secure condition. Includes the removal of stored radioactive and/or hazardous waste from the facility and implementation of appropriate facility safety requirements.

Document - Recorded information that describes, specifies, reports, certifies, requires, or provides data or results.

Facility - Those buildings and equipment directed to a common purpose and those activities and supporting elements occurring at a single location.

Graded Approach - A process by which the level of analysis, documentation, and actions necessary to comply with a requirement in this part are commensurate with the following:

- Relative importance to safety, safeguards, and security
- Magnitude of any hazard involved
- Life cycle stage of a facility
- Programmatic mission of a facility
- Particular characteristics of a facility
- Any other relevant factor.

Important-to-Safety - Structures, systems, and components that serve to provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the workers and the public.

This definition includes not only those structures, systems, and components that perform safety functions and traditionally have been classified as safety class, safety-related, or safety-grade, but also those that place frequent demands on or adversely affect the performance of safety functions if they fail or malfunction (i.e., support systems, subsystems, components). As the design matures and results from risk assessments identify vulnerabilities resulting from nonsafety-related equipment, additional structures, systems, and components should be considered for inclusion within this definition.

Integrated Safety Management Program - A set of integrated activities that is directed toward the management or control of radiological, nuclear, and process hazards such that adequate protection is provided to workers, the public, and the environment.

Item - All-inclusive term used in place of any of the following: appurtenance, assembly, component, equipment, material, module, part, structure, subassembly, subsystem, system, unit, or support systems.

Nuclear Facility - Reactor and nonreactor nuclear facilities; the TWRS-P facility is a nonreactor nuclear facility.

Process - (related to safety) Any activity involving radioactive materials or a hazardous chemical including use, storage, manufacturing, handling, or the onsite movement of such materials, or a combination of these activities.

Process - A series of actions that achieve an end result.

Process Safety - The operation of facilities that handle, use, process, or store hazardous materials in a manner free of episodic or catastrophic incidents. However, the handling, use, processing, and storage of materials with inherent hazardous properties can never be done in the total absence of risk. Process safety is an ideal condition towards which to strive.

Project Management - Project Management is defined by the following positions within the TWRS-P Project organization: Project Manager, QA Project Manager, Licensing and Permitting Manager, Technical Manager, Area Project Managers: Pretreatment Area Project Manager, Vitrification Area Project Manager, and Balance of Facilities/Interface Area Project Manager, Procurement Manager, Project Controls Manager, and Contracts Manager.

Public - Individuals outside the boundary that defines the BNFL Inc. TWRS-P location for the offsite receptor.

Quality - The condition achieved when an item, service, or process meets or exceeds the user's requirements and expectations.

Quality Assurance - All those actions that provide confidence that quality is achieved.

Quality Assurance Program - The overall program established to assign responsibilities and authorities, define policies and requirements, and provide for the performance and assessment of work.

Record - An authenticated document or other media that furnishes evidence of a function, policy, decision, procedure, or other essential transaction.

Regulatory Unit - The organization reporting to the U.S. Department of Energy Director of the Regulatory Unit dedicated to supporting the Director in executing regulatory authority for the TWRS-P facility.

Repair - A nonconforming item fixed per the approved original requirement.

Requirements - Standards that are mandated by an authority through statute, regulation, or contract.

Rework - A nonconforming item fixed per alternate requirements (i.e., different than those originally specified).

Service - The performance of work, such as design, construction, fabrication, inspection, nondestructive examination/testing, environmental qualification, equipment qualification, repair, installation, or the like.

Standards - The expressed expectation for the performance of work.

Worker - An individual within the controlled area of the facility performing work for or in conjunction with the Contractor or using Contractor facilities.

Note: Most of the terms listed in this glossary have been taken from DOE/RL-96-0006, Rev. 0.

This page intentionally left blank.

12.0 REFERENCES

10 CFR 830.120, "Quality Assurance Requirements," *Code of Federal Regulations*.

ANSI/ASQC E-4, 1994, *Quality Systems Requirements for Environmental Programs*, Milwaukee, Wisconsin.

ASME NQA-1, 1994, Part I, *Quality Assurance Requirements for Nuclear Facility Applications*, American Society of Mechanical Engineers, New York, New York.

DOE G 414.1-1, "Implementation Guide for Use with Independent and Management Assessment Requirements of 10 CFR 830.120," U.S. Department of Energy, Germantown, Maryland.

DOE-RL, 1996, *Top-Level Radiological Nuclear, and Process Safety-Standards and Principles for Tank Waste Remediation System (TWRS) Privatization Contractors*, DOE/RL-96-0006, Rev. 0, U.S. Department of Energy, Richland, Washington.

IAEA 50-C-QA, *Establishing and Implementing a Quality Assurance Programme*, Vienna, Austria.

ISO 9001 (ANSI/ASQC-Q9001), *Quality Systems — Model for Quality Assurance in Design/Development, Production, Installation, and Servicing*, Milwaukee, Wisconsin.

NUREG-1293, 1991, *Quality Assurance Guidance for a Low-Level Radioactive Waste Disposal Facility*, Rev. 1, U.S. Nuclear Regulatory Commission, Washington, D.C.

QARD, 1995, *Quality Assurance Requirements and Description for the Civilian Radioactive Waste Management Process*, DOE/RW-0333P, Rev. 5, Washington, D.C.

This page intentionally left blank.

APPENDIX A

IMPLEMENTATION PLAN FOR TANK WASTE REMEDIATION SYSTEM-PRIVATIZATION PROJECT QUALITY ASSURANCE PROGRAM

This page intentionally left blank.

1.0 INTRODUCTION

The current Quality Assurance Plan (QAP) and the Implementation Plan address the criteria stipulated by the Quality Assurance (QA) Rule (10 *Code of Federal Regulations* [CFR] Part 830.120), the companion guidance document to the rule, "Implementation Guide for use with 10 CFR 830.120 Quality Assurance, G-830.120-Rev. 0," April 15, 1994, as well as the QA principles stipulated by DOE in the document "Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for Tank Waste Remediation System-Privatization (TWRS-P) Contractors, DOE/RL-96-0006, Revision 0."

This QAP Implementation Plan describes how the criteria of 10 CFR 830.120 will be satisfied during Part B of the project and support the *Quality Assurance Program*, developed for the design stage of Part B.

This Implementation Plan is a revision of the initial submittal and is submitted as a part of the QAP for Part B activities. The QAP and Implementation Plan shall be reviewed and revised as required by the evolution of work related to the phased structure of the TWRS-P Project.

2.0 IMPLEMENTING DOCUMENTS AND PROCEDURES

The Quality Management System described in the QAP focuses on the controls and systems necessary to ensure the quality of work for the design stage of Part B. The QAP is supplemented by implementing documents/procedures developed or approved for use on the project.

The implementation of QA criteria, as specified in 10 CFR 830.120, is provided in Table A-1. Documents and procedures identified are management plans and procedures for implementation of the TWRS-P QAP. Detailed work procedures shall be issued before start of work with adequate time to conduct training.

Technology development activities and testing programs are conducted in accordance with applicable requirements of 10 CFR 830.120, ASME NQA-1, or other consensus standard.

BNFL Inc. shall establish and implement procedures for audits and independent assessments to evaluate the performance of the work processes. Audits and assessments shall be conducted by BNFL Inc. at each subcontractor location providing technology development and testing services.

3.0 MILESTONE SCHEDULE

3.1 QAP AND IMPLEMENTATION PLAN

The milestone schedule for submitting the QAP and its Implementation Plan for the remaining life stages of the TWRS-P is proposed as follows:

Start of Construction

- Develop and issue revision of QAP and its Implementation Plan for internal review:
  - 60 days before submittal of Limited Work Authorization (LWA)

- Internal review and comments resolution:
  - 30 days before submittal of LWA

- Issue final revision and internal approval:
  - 15 days before submittal of LWA

- Issue revision of QAP and its Implementation Plan to the U.S. Department of Energy (DOE):
  - With the submittal of LWA

Start of Operation

- Develop and issue revision of QAP and its Implementation Plan for internal review:
  - 120 days before start-up

- Internal review and comments resolution:
  - 90 days before start-up

- Issue final revision and internal approval:
  - 75 days before start-up

- Issue revision of QAP and its Implementation Plan to DOE:
  - 60 days before start-up

Start of Deactivation

- Develop and issue revision of QAP and its Implementation Plan for internal review:
  - 120 days before start of deactivation

- Internal review and comments resolution:
  - 90 days before start of deactivation

- Issue final revision and internal approval:
  - 75 days before start of deactivation

- Issue revision of QAP and its Implementation Plan to DOE:
  - 60 days before start of deactivation

Changes to the QAP that affect commitments specified in a previously approved QAP shall be submitted to the Regulatory Unit for review and approval 30 days before the implementation of subject changes.

3.2 PROJECT PROCEDURES AND PLANS

- Issue a numbering system for project documents, including project procedures.
  - Completion date: 10 days following notification from DOE to proceed into Part B.

- Issue project procedures to control preliminary design activities.
  - Completion date: 30 days following notification from DOE to proceed into Part B.

- Issue Training and Qualification Plan (design stage).
  - Completion date: 30 days following notification from DOE to proceed into Part B.

4.0 TRACKING

A commitment tracking program shall be established to ensure that project activities are performed on schedule and in compliance with the nuclear safety requirements.

- Completion date: 30 days following notification from DOE to proceed into Part B.

Table A-1. Quality Assurance Program Implementation Matrix. (Sheet 1)

QA Criteria	Implementing Documents/Procedures	Project Activity (Phase)								
		Prel. Design	Detailed Design	Procurement	Site Preparation	Construc-tion	Start-up	Operation	Deactiva-tion	Project Close-out
I Quality Program	Project Management Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Safety Classification of SSC	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Designation of QL and QAP Requirements	✓	✓	✓	✓	✓	✓	✓	✓	
	QA Authority to Stop Work	✓	✓	✓	✓	✓	✓	✓	✓	
	Preparation, Review, and Approval of QAP	✓	✓	✓	✓	✓	✓	✓	✓	✓
II Personnel Training and Qualification	Indoctrination and Training of Project Personnel	✓	✓	✓	✓	✓	✓	✓	✓	
	Training and Qualification Plan (Design & Construction)	✓	✓	✓	✓	✓				
	Training and Qualification Plan (Operations)					✓	✓	✓	✓	✓
	Qualification of Personnel (e.g., ASME, WAC)		✓	✓	✓	✓	✓	✓	✓	
III Quality Improvement	Nonconformance Reporting	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Corrective Action	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Corrective Action Tracking System	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Root Cause Analysis		✓	✓	✓	✓	✓	✓	✓	

Table A-1. Quality Assurance Program Implementation Matrix. (Sheet 2)

QA Criteria	Implementing Documents/Procedures	Project Activity (Phase)								
		Prel. Design	Detailed Design	Procurement	Site Preparation	Construc-tion	Start-up	Operation	Deactiva-tion	Project Close-out
III Quality Improvement (Cont'd)	Identification, Tracking, and Reporting of PAAA Noncompliance	✓	✓	✓	✓	✓	✓	✓	✓	
IV Documents and Records	Document Control	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Records Management	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Project Filing System	✓	✓	✓	✓	✓	✓	✓	✓	✓
V Work Processes	Preparation, Review, and Approval of Project Procedures	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Design Process	✓	✓	✓	✓	✓	✓	✓	✓	
	Identification and Control of Items			✓	✓	✓	✓	✓	✓	✓
	Control of Special Processes				✓	✓	✓	✓	✓	
	Control of M&TE				✓	✓	✓	✓	✓	
	Handling, Storage, and Shipping			✓	✓	✓	✓	✓	✓	
VI Design	Design Process	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Project Design Criteria	✓	✓	✓	✓	✓	✓	✓	✓	
	Engineering Standards and Guides	✓	✓	✓	✓	✓	✓	✓	✓	✓
	V&V of Computer Programs; Error Reporting	✓	✓	✓	✓	✓	✓	✓	✓	
	Project Interface Control	✓	✓	✓	✓	✓	✓	✓	✓	
	Basis of Design	✓	✓	✓	✓	✓	✓	✓	✓	

Table A-1. Quality Assurance Program Implementation Matrix. (Sheet 3)

QA Criteria	Implementing Documents/Procedures	Project Activity (Phase)								
		Prel. Design	Detailed Design	Procurement	Site Preparation	Construc-tion	Start-up	Operation	Deactiva-tion	Project Close-out
VI Design (Cont'd)	Engineering Drawings	✓	✓	✓	✓	✓	✓	✓	✓	
	Engineering Calculations	✓	✓	✓	✓	✓	✓	✓	✓	
	Procurement and Installation Specifications	✓	✓	✓	✓	✓	✓	✓	✓	
	Design Review	✓	✓	✓	✓	✓	✓	✓	✓	
	Design Verification	✓	✓	✓	✓	✓	✓	✓	✓	
	Design Change Control	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Configuration Management	✓	✓	✓	✓	✓	✓	✓	✓	✓
VII Procurement	Content of Procurement Documents	✓	✓	✓	✓	✓	✓	✓	✓	
	Review of Procurement Documents	✓	✓	✓	✓	✓	✓	✓	✓	
	Supplier Qualification	✓	✓	✓	✓	✓	✓	✓	✓	
	Supplier Monitoring	✓	✓	✓	✓	✓	✓	✓	✓	
VIII Inspection and Acceptance Testing	Receiving Inspection			✓	✓	✓	✓	✓	✓	
	Site and Construction Inspection				✓	✓	✓	✓	✓	
	In-process Inspection			✓	✓	✓	✓	✓	✓	
	Test Control			✓	✓	✓	✓	✓	✓	
	Control of M&TE				✓	✓	✓	✓	✓	
	Identification of Testing Status					✓	✓	✓	✓	

Table A-1. Quality Assurance Program Implementation Matrix. (Sheet 4)

QA Criteria	Implementing Documents/Procedures	Project Activity (Phase)								
		Prel. Design	Detailed Design	Procurement	Site Preparation	Construc-tion	Start-up	Operation	Deactiva-tion	Project Close-out
IX Management Assessment	Management Self-Assessment	✓	✓	✓	✓	✓	✓	✓	✓	
	Management Review	✓	✓	✓	✓	✓	✓	✓	✓	✓
X Independent Assessment	QA Audit and Assessments	✓	✓	✓	✓	✓	✓	✓	✓	✓
	QA Surveillance	✓	✓	✓	✓	✓	✓	✓	✓	
	Project Safety Committee	✓	✓	✓	✓	✓	✓	✓	✓	

✓ = Indicates the implementing documents/procedures in place.

ASME = American Society of Mechanical Engineers
M&TE = measurement and test equipment
PAAA = Price-Anderson Amendments Act
QA = quality assurance
QAP = Quality Assurance Program
SSC = structure, system, component
V&V =verification and validation
WAC = *Washington Administrative Code*

This page intentionally left blank.